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TITLE OF THE INVENTION (280 characters maximum)

CONDITIONING HAIR LIGHTENER SYSTEM, COMPOSITIONS, METHOD AND KIT THEREFOR

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Respectfully submitted,

SIGNATURE Dolores T. Kenney Date: January 29, 2004

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CONDITIONING HAIR LIGHTENER SYSTEM, COMPOSITIONS, METHOD AND KIT THEREFOR

Technical Field of the Invention

This invention relates to the modification of the natural color of hair, and in particular, to lightening of hair color while ameliorating loss of hair strength.

Background of the Invention

People like to change the color of their hair if it is not satisfactory, or simply as a fashion whim, by either chemically dying the hair to a different color or by lightening its natural color. In particular, lightening of human hair has been widely practiced since Roman times and is now a well known cosmetic process.

Chemical lightening or bleaching of the natural hair pigment is recognized as an oxidative process and the most satisfactory oxidizing agent is an aqueous solution of hydrogen peroxide (or source thereof). In practice, the oxidizing action of hydrogen peroxide is activated by increasing the pH to an alkaline pH, typically with ammonium hydroxide (or source thereof), and can be accelerated by increasing the alkalinity to a pH value in the range of about 8 to about 11.5, and including peroxy salts, such as persulfates, percarbonates, perborates, and the like, as "boosters" or "accelerators".

The depth of color on hair is conventionally described in terms of levels classified by a range of 12 shades, with level 1 being the darkest (i.e., black) and level 12 being the lightest (i.e., ultra light blonde). The shade levels assigned to this numbering system are described by Brown, K.C., *et al.*, in the SCC Monograph, *Permanent Hair Dyes*, p. 22, published by the Society of Cosmetic Chemists (1996).

The practice of chemically lightening the natural color of hair to varying shade levels typically involves applying an oxidizing agent, generally liquid hydrogen peroxide (or hydrogen peroxide source) to the hair, and leaving it in contact with the hair for a sufficient period of time to effectively achieve a desired lighter hair shade. The degree of lightening can be varied by: a) gradually lightening or highlighting the hair with either acidic hydrogen peroxide

or brief multiple treatments with alkaline hydrogen peroxide, or b) decoloring the hair several levels by contacting the hair for prolonged periods of up to about one hour or longer with alkaline, generally ammoniacal, hydrogen peroxide-containing compositions. For example, by bleaching the hair more than 3 to 4 levels, a person with dark hair can achieve a blonde shade. A change of 6 to 7 levels in the color of dark hair is usually the maximum practical reduction achieved with strong alkaline bleaches, i.e., having a relatively high alkaline pH value above about 9.

Most strongly alkaline bleaching is typically accomplished with ammoniacal, high volume hydrogen peroxide and peroxy salt boosters, such as sodium persulfate, potassium persulfate, ammonium persulfate and mixtures thereof. Formulations of this type commonly have at least two and usually all three of the persulfate salts, with ammonium persulfate providing an ammonia source. Such strongly alkaline bleaches, however, are known to damage the hair extensively by swelling the hair, thereby structurally weakening the tensile properties of the fibers resulting in breakage, and negatively affecting the aesthetic subjective properties resulting in a delustered appearance and straw-like feel, especially as the contact time on the hair is prolonged.

There is an ongoing need and desire, therefore, for compositions and processes for achieving hair lightening at a relatively high alkaline pH with minimal hair damage. The present invention provides a conditioning hair lightener system, compositions, method, and kit therefor, which ameliorate the deleterious action of chemical oxidative lightening on the hair.

Summary of the Invention

A conditioning hair lightener system is disclosed which ameliorates the deleterious action of chemical oxidative lightening on the strength and subjective properties of human hair. The conditioning hair lighter system comprises at least two components (A) and (B), which are admixed with one another substantially immediately before use to provide a conditioning hair lightener.

Component (A) is a substantially anhydrous, substantially free-flowing composition comprising a conditioning amount of a water-

dispersible, self-emulsifying, fatty acid-derived conditioner, an effective hair-lightening amount of at least one peroxy salt, and optionally a water-soluble cosmetic adjuvant. Component (B) is an aqueous medium preferably containing hydrogen peroxide or a hydrogen peroxide source. Component (A) substantially immediately forms an emulsion when mixed with Component (B). Component (A) preferably includes sufficient alkaline ingredients to provide a conditioning hair lightener emulsion having a pH of at least about 8.

The self-emulsifying, fatty acid-derived conditioner preferably comprises a fatty ester, an ethoxylated glyceride, a fatty alcohol, a fatty ether, and any combination thereof, and any formulation thereof optionally containing one or more hydrophilic surfactant, such as an anionic surfactant, a nonionic surfactant, and the like.

A particularly preferred self-emulsifying, fatty acid-derived conditioner for use in Component (A) comprises a water-dispersible, self-emulsifying combination of esters of C_6-C_{22} fatty acids. The combination of esters preferably comprises at least one polyhydric ester selected from the group consisting of: (a) a C_3-C_4 polyol ester of a C_6-C_{22} fatty acid, (b) a glyceryl ester of a C_6-C_{22} fatty acid and at least one acid selected from the group consisting of citric acid, lactic acid and succinic acid, and (c) a polyethoxylated C_{12}-C_{18} acylated sorbitol ester. The peroxy salt is preferably selected from the group consisting of an alkali metal persulfate, ammonium persulfate, and mixtures thereof.

For lightening hair under relatively high alkaline conditions at a pH of at least about 9, either one of Component (A) or Component (B) preferably may contain a hair protective, deswelling agent.

A conditioning hair lightener system of this invention may also include at least one of a post-lightener acidic hair conditioner having a pH of not more than about 5, a post-lightener cationic hair conditioner, a post-lightener shampoo preferably having a pH in the range of about 4 to about 6. Preferably the conditioning hair lightener system is provided in a kit form, optionally including one or more hair lightening implements.

A preferred method of lightening hair comprises preparing a conditioning hair lightener emulsion by admixing Component (A) and Component (B), as described herein, substantially immediately before use, contacting the hair with sufficient conditioning hair lightener emulsion for a time period sufficient to achieve the level of lightening desired, and removing the hair lightener emulsion from the hair, as by water rinsing. In a particularly preferred method aspect, the lightened hair is contacted with a post-lightener acidic conditioner prior to, concurrently with, or after removal of the hair lightener emulsion from the lightened hair.

A conditioning hair lightener system of this invention beneficially ameliorates the deleterious effect on the tensile and tactile properties of oxidatively lightened hair under relatively high alkaline conditions.

Detailed Description of Preferred Embodiments

The term "conditioning" as applied to a hair lightener emulsion includes the amelioration of at least one of the deleterious undesirable effects conventionally associated with the action of alkaline and oxidative products on the integrity of the hair fibers, i.e., a lessening of the tensile strength, loss in wet elasticity, an increase in alkali solubility, as well as loss of a smooth tactile feel and diminished lustrous appearance.

The terms "substantially anhydrous," and "dry weight" are used interchangeably herein to mean that not more than about five weight percent of water, preferably not more than about two weight percent, more preferably not more than about one weight percent, of water is present either as free water, water of hydration, or water of reaction, as applied to an ingredient or formulated composition.

The preferred hair lightener embodiments are described primarily for lightening the color of scalp hair but are not limited thereto. The term "hair" is intended to also encompass hair on the body, including the face, trunk and limbs.

The terms "alkyl" and "alkanol" as used herein refer to compounds having about 2 to about 9 carbon atoms in the alkyl or alkanol chain. The term "polyhydric" includes polyols having 3 to about 6 carbon atoms.

Cosmetic ingredients, additives, products or materials, and optional cosmetic adjuvants, that can be employed in the hair lightener compositions and system discussed herein are referred to by their commonly used chemical names or by the international nomenclature commonly referred to as INCI name given them in any edition of the *International Cosmetic Ingredient Dictionary and Handbook*, (hereafter INCI Dictionary), such as found in Volumes 1-3, of the Seventh Edition (1997) or Eighth Edition (2000), all published by the Cosmetic, Toiletry, and Fragrance Association, Washington DC. Numerous commercial suppliers of materials listed by INCI name, trade name or both can be found in any edition of the INCI Dictionary and in numerous commercial trade publications, including but not limited to, the *2001 Cosmetic Bench Reference*, edition of *COSMETICS & TOILETRIES®, 115 (13)*, published by Allured Publishing Corporation, Carol Stream, IL (2001), and the *2001 McCutcheon's* Directories, Volume 1: Emulsifiers & Detergents and Volume 2: Functional Materials, published by McCutcheon's Division, The Manufacturing Confectioner Publishing Co., Glen Rock, NJ (2001); the relevant disclosures of the INCI Dictionary and each of the foregoing publications being incorporated herein by reference.

The term "cosmetic adjuvant" includes cosmetically useful product finishing and promotional additives, well known and conventionally used in the cosmetic arts to maintain the free flow properties of a substantially anhydrous composition, the physical stability of a composition during storage (shelf life), and the visible aesthetic appearance of a composition during storage and during the use of the composition. Cosmetic adjuvants that maintain the stability of products typically include a metal-ion chelating agent, an antioxidizing agent, a preservative, an emulsifying agent, a perfume solubilizer, and the like, but are not limited thereto. Cosmetic adjuvants, sometimes called promotional ingredients, aid in enhancing the aesthetics and marketing appeal of the product and include, without limitation, a product colorant, a fragrance, and the like.

The term "self-emulsifying, fatty acid-derived conditioner" as used herein, and in the appended claims, refers to a fatty ester, an ethoxylated glyceride, a fatty alcohol, a fatty ether, and combinations thereof, and

formulations thereof optionally containing one or more hydrophilic surfactant, such as an anionic surfactant, a nonionic surfactant, and the like, wherein the conditioner is water dispersible and substantially immediately forms an emulsion in an aqueous medium at an ambient temperature preferably in the range of about 10 to about 35 °C.

Fatty esters include, without limitation thereto, mono-, di- and tri- C_3-C_4 polyol esters of C_6-C_{22} fatty acids and mixtures thereof, such as caprylic/capric triglyceride, caprylic/capric/lauric triglyceride, caprylic/capric/myristic/stearic triglyceride, vegetable oils, fats, glyceryl distearate, glyceryl caprylate, glyceryl caprate/caprylate, glyceryl stearate, propylene glycol stearate, butylene glycol stearate, and the like; a glyceryl ester of a C_6-C_{22} fatty acid and at least one acid selected from the group consisting of citric acid, lactic acid and succinic acid (e.g., glyceryl cocoate/citrate/lactate), and the like; fatty esters of carbohydrates and reduced carbohydrates, such as polyethoxylated C_{12}-C_{18} acylated sorbitol ester (e.g., PEG-40) sorbitan peroleate), C_{12}-C_{18} acylated sorbitol esters, sucrose esters, glucose esters, and the like; and fatty alcohol esters of fatty acids, such as cetyl palmitate, cetyl myristate, and the like.

Ethoxylated glycerides include, without limitation thereto, ethoxylated hydroxy-substituted triglycerides, ethoxylated diglycerides, and ethoxylated monoglycerides, such as polyethoxylated castor oil, polyethoxylated glyceryl stearate, and the like.

Preferred fatty alcohols include, without limitation thereto, cetyl alcohol, stearyl alcohol, lauryl alcohol, oleyl alcohol, and the like.

Fatty ethers include, without limitation thereto, polyethoxylated fatty alcohols, such as polyethoxylated cetyl alcohol, polyethoxylated stearyl alcohol, and mixtures thereof, (polyethyoxylated cetearyl alcohol), and the like; fatty alcohol glycosides, such as cetearyl glucoside, and the like.

Particularly preferred are fatty esters derived from vegetable oils, such as coconut oil, palm kernel oil, castor oil, babassu oil, soybean oil, peanut oil, corn oil, sunflower seed oil, grape seed oil, safflower oil, meadowfoam oil,

olive oil, palm oil, wheat germ oil, avocado oil, almond oil, and the like, without being limited thereto, with coconut oil and palm kernel oil being preferred.

A particularly preferred self-emulsifying, fatty acid-derived conditioner for use in Component (A) comprises a water-dispersible, self-emulsifying combination of esters of C_6-C_{22} fatty acids containing at least one polyhydric ester selected from the group consisting of: (a) a C_3-C_4 polyol ester of a C_6-C_{22} fatty acid, (b) a glyceryl ester of a C_6-C_{22} fatty acid and at least one acid selected from the group consisting of citric acid, lactic acid and succinic acid, and (c) a polyethoxylated C_{12}-C_{18} acylated sorbitol ester. Particularly preferred is a combination of caprylic/capric triglyceride, glyceryl cocoate/citrate/lactate (*INCI* name for a product sold under the tradename INWITOR® 380), and PEG-40 sorbitan peroleate.

Suitable water dispersible, self-emulsifying, fatty acid-derived conditioners may also include commercially available formulations having the *INCI* names, cetearyl alcohol(and)sodium cetearyl sulfate (such as LANETTE® N), cetearyl alcohol(and)sodium lauryl sulfate(and)sodium cetearyl sulfate (LANETTE® SX), cetearyl alcohol(and)sodium lauryl sulfate (such as LANETTE® W); cetearyl alcohol(and)PEG-40 castor oil(and)sodium cetearyl sulfate(such as EMULGADE® F), cetearyl alcohol(and)PEG-40 castor oil (EMULGADE® F SPEC), cetearyl glucoside(and)cetearyl alcohol (EMULGADE® PL68/50), glyceryl stearate(and)ceteareth-20(and)ceteareth-10(and)cetearyl alcohol(and)cetyl palmitate (EMULGADE® SE), cetearyl alcohol(and)ceteareth-20 (EMULGADE® 100NI), and the like.

In a preferred embodiment of Component (A), the amount of self-emulsifying, fatty acid-derived conditioner is in the range of about 0.1 to about 10 weight percent, preferably in the range of about 0.5 to about 8 weight percent, more preferably in the range of about 0.75 to about 5 weight percent, of the total weight of Component (A), but is not limited thereto. The peroxy salt can be an alkali metal salt of a persulfate, a percarbonate, a perborate, and the like, or a salt that is a source of ammonia. Preferably, the peroxy salt is selected from ammonium persulfate, sodium persulfate, potassium persulfate, and mixtures thereof. The total amount of peroxy salt, based on the weight of

Component (A) may be in the range of about 20 to about 75 weight percent, preferably in the range of about 25 to about 60 parts by weight percent.

Component (A) also optionally includes at least one water-soluble cosmetic adjuvant. Water-soluble cosmetic adjuvants, when present, are preferably substantially anhydrous, and may be a flow control agent, an auxiliary hair conditioning agent, a wetting agent, a viscosity adjusting agent, a pH adjusting agent, a product finishing agent, and the like, and mixtures thereof. Those skilled in the formulation arts will recognize that ingredients in a formulation can serve more than one function.

The term "flow control agents" as used herein refers to compounds that provide binding, or anticaking properties, or both, to keep Component (A) in a free-flowing, homogeneous state prior to being mixed with Component (B). Flow control agents well known in the art include, without limitation thereto, binder agents, such as gums, polymers, silica, polyalkyleneimines (e.g., polyethyleneimines) and the like, and mixtures thereof. As described below, binder agents, such as gums and polymers may also function as viscosity modifying agents when Component (A) is mixed with an aqueous liquid medium. Anticaking agents well known in the art include, without limitation thereto, stearate soaps, such as sodium stearate, aluminum stearate, calcium stearates, and the like, magnesium carbonate, magnesium aluminum silicate, and mixtures thereof.

Auxiliary hair conditioning agents preferably include, without limitation thereto, cationic polymers, such as homopolymers of dimethyldiallylammonium (DMDAC) salts, (e.g., Polyquaternium-6), copolymers of DMDAC (e.g., Polyquaternium-7, Polyquaternium-4), cationic cellulose derivatives, (Polyquaternium-10), cationic guar gum, quaternized vinylpyrrolidone/vinylimidazole polymers, and the like. Polyquaternium-6 in substantially, anhydrous powder form is particularly preferred. Auxiliary hair conditioning agents may also be monomeric quaternary ammonium compounds and salts thereof well known in the cosmetics arts. Auxiliary hair conditioning agents, when present, are preferably in the range of about 1 to about 5 weight percent of the weight of Component (A).

Viscosity modifying agents include, but are not limited to, substantially anhydrous, water-soluble thickeners selected from the group consisting of cellulose ethers, starches, gums, polymers, and the like, and combinations thereof. Exemplary cellulose ethers include methyl cellulose, ethyl cellulose, hydroxyethyl cellulose, methylhydroxyethyl cellulose, methylhydroxypropyl cellulose and carboxymethyl cellulose; exemplary starches include corn starch; starch ethers including carboxymethyl starch; hydroxyethyl starch and methyl starch; exemplary gums include guar gum, xanthan gum, alginates, and exemplary polymers include cationic polymers, such as cationic cellulose derivatives, cationic starch, and anionic polymers in substantially anhydrous form. Preferred water-soluble thickeners are xanthan gum, hydroxyethylcellulose, and mixtures thereof. The amount of thickener can be readily determined by the skilled formulator based on the viscosity desired when Component (A) is admixed with Component (B).

Wetting agents include, but are not limited to, nonionic surfactants, anionic surfactants, cationic surfactants, amphoteric surfactants (including zwitterionic surfactants), and mixtures thereof, so long as they are in substantially anhydrous liquid or solid form. Wetting agents are well known in the art and commercially available from numerous sources found in the trade literature. When present, wetting agents are preferably in the range of about 1 to about 10 weight percent, based on the weight of Component (A).

Component (A) preferably provides a pH in the range of at least about pH 8 to about pH 11, when Component (A) is mixed with Component (B) for use. Component (A) preferably includes an effective amount of alkalizing agent, either in the self-emulsifying, fatty acid-derived conditioner or includes a pH adjusting additive, to provide the desired pH when Component (A) is mixed with Component (B). Exemplary pH adjusting agents may include, without limitation thereto, alkali metal salts, such as sodium metasilicate, sodium carbonate, ammonium bicarbonate, and the like, and mixtures thereof. Those skilled in the art will recognize that a buffering agent, such as sodium bicarbonate, an acidifying agent, such as organic acid in substantially anhydrous

form, and the like, can be employed to achieve a desired pH in the final composition, if necessary.

Exemplary product finishing agents include, without limitation thereto, chelating agents for heavy metals, e.g. salts of ethylenediaminetetraacetic acid, as well as cosmetically acceptable colorants known in the art, such as an ultramarine dyestuff, an acidic dyestuff, a lake, a pigment, and the like.

Those skilled in the formulation arts will recognize that the usefulness and actual amounts of individual ingredients or combination thereof is limited only by the stability of the ingredient in the formulation during storage, and in the presence of oxidizing agent during use when Component (A) is mixed with Component (B). The actual amounts of individual ingredients or combination thereof and water-soluble cosmetic adjuvants can be readily determined by the skilled formulator based on the properties desired in Component (A) and Component (B) separately and when admixed for use.

Component (B) preferably is an aqueous liquid medium containing a concentration of hydrogen peroxide in the range of about 1 to about 12 weight percent, more preferably in the range of about 3 to about 6 weight percent (i.e., such as 10 to 20 volume hydrogen peroxide), on a total liquid Composition (B) weight basis. Commercially available liquid hydrogen peroxide is generally stabilized to a pH in the range of about 3 to about 4, as is well known in the art. A preferred Component (B) may be provided in the form of a hydrogen peroxide-containing emulsion typically referred to in the hair coloring arts as a "creme developer". Alternatively, a substantially anhydrous powder form of a hydrogen peroxide source may be provided, such as urea peroxide, sodium perborate, sodium carbonate peroxide, and the like, which is dissolved in water to provide a hydrogen peroxide containing liquid medium.

For lightening hair under relatively high alkaline conditions, i.e., pH of at least about 9, and especially at a pH of at least about 10, either one of Component (A) or Component (B) preferably may contain a hair protectant, deswelling agent, such as described in U.S. Patents No. 5,348,737, No. 5,756,077, No. 5,639,449 and No. 5,641,477, all to Syed, et al., the disclosures of which are incorporated herein by reference. Deswelling agents

include, without limitation thereto, a starch hydrolysate, a sugar, such as sucrose, glucose, and fructose, a polyol, such as glycerol, propylene glycol, sorbitol, and mixtures thereof. Particularly preferred is a hydrogenated starch hydrolysate, (such as those sold in various grades under the trade name HYSTAR®, e.g., HYSTAR® HM-75, HYSTAR® 7000, HYSTAR® 6075, and HYSTAR® CG), or sorbitol. A presently preferred Component (B) is a hydrogen peroxide-containing emulsion including a starch hydrolysate, commercially available under the trade name MoisturColor™, Moisturizing Creme Developer from Avlon Industries, Inc.

A preferred hair protectant is a cationic polymer. A particularly preferred cationic polymer is described in U.S. Patent No.5,756,077 as the reaction product of a dialkylamine (where the alkyl group has 1 to 3 carbon atoms), and a difunctional epoxy-type reactant and a third reactant selected from the group consisting of ammonia, primary amines, alkylenediamines having two to six carbon atoms in the alkylene group and polyamines, such as the product of a condensation reaction of ethylenediamine, dimethylamine and epichlorohydrin (commercially available under the trade name Betz® Polymer 1195). The cationic polymer is described in more detail in U.S. Pat. No. Re. 28,808 to Panzer et al., (See, for instance, Example 2 of the '808 reissue patent), and U.S. Pat. No. 4,661,259 to Walterick et al., the relevant disclosures of which are incorporated herein by reference.

Component (A), on being mixed with Component (B), preferably in a weight ratio of (A):(B) in a range of about 1:1 to about 1:4, more preferably in a range of about 1:2 to about 1:3, provides a non-runny, conditioning hair lightener emulsion substantially immediately, i.e., within about five minutes, preferably within about 3 minutes, more preferably within about 2 minutes, with minimal manual mixing agitation, such as by stirring or shaking at ambient room temperature. The viscosity of the resultant hair lightener emulsion is not limited as long as the emulsion remains in contact with, and does not drip from, the hair during the hair lightening process. A suitable viscosity is at least about 30,000 mPa•s (Brookfield viscometer, Model No. RVT, Helipath Spindle C, at 10 revolutions per minute), but is not limited thereto. A particularly preferred conditioning hair lightener emulsion embodiment for lightening hair at a

relatively high alkaline pH is in the form of a cream or paste having a viscosity in the range of about 65,000 to about 80,000 mPa•s, and a pH of at least about 9, more preferably in the range of about 10 to about 10.5.

The hair lightener system of this invention may also include a post-lightening acidic conditioner, which preferably is an aqueous composition having a pH value of not more than about pH 5, more preferably in the range of about pH 3 to about pH 4.

The post-lightening acidic conditioner may be a hair protectant composition of the type described in U.S. Patent No.5,756,077 to Syed, et al., the disclosures of which are incorporated herein by reference.

A preferred post-lightening acid conditioner embodiment includes at least one of a nonionic polymer thickener, a water-dispersible, cationic polyquaternary polymer, and the like, such as described in U.S. Patents No.5,756,077, No. 5,348,737, and No. 5,639,449, all to Syed, et al., the relevant disclosures of which are incorporated herein by reference.

A preferred polymeric thickener is polyvinylpyrrolidone (PVP), preferably having a K value of about 90, or a PVP derivative, such as vinylpyrrolidone/dialkylaminoalkyl acrylate or methacrylate copolymers (quaternized or unquaternized),(e.g. such as those sold under the name GAFQUAT®), but is not limited thereto.

The inventive hair lightener system can also include a post-lightener cationic hair conditioner, containing at least one of a polymeric or non-polymeric quaternary ammonium hair conditioning compound or salts thereof.

The hair lightener system of this invention may also include a post-lightening shampoo, preferably having a pH in the range of about 4 to about 6. A particularly preferred post-lightening shampoo contains sufficient free acid to substantially neutralize any residual alkalinity in the lightened hair, such as are conventionally referred to in the art as a "normalizing" type shampoo.

Component (A) can be manufactured by methods known in the art for blending substantially dry ingredients under manufacturing conditions that avoid dampness, such as by employing a powder mixer, such as a ribbon blender, a mechanical fluidized bed mixer, a V-blender, a conical mixer, and the like. A

preferred method is to prepare a mixture of the peroxy salt portion with the cosmetic adjuvant portion, when present, and then add the self-emulsifying, fatty acid-derived conditioner portion to provide Component (A). Preferably, the self-emulsifying, fatty acid-derived conditioner portion is in a liquid form, in which case, one or more liquid self-emulsifying fatty acid-derived conditioner ingredients can be premixed to provide a liquid blend. Where one or more self-emulsifying fatty acid-derived conditioner is in a non-liquid form, such as a flake, powder, or pellet, and one or more of self-emulsifying fatty acid-derived conditioner is a liquid, the non-liquid conditioner ingredient can be included in the liquid (i.e., dissolved or dispersed in the liquid, heating if necessary), or can be included in the premixed peroxy salt containing portion. The method of manufacturing is unlimited as long as a substantially free flowing Component (A) is obtained. Component (A) may be ground using powder grinding units and powder sifters, known in the art, to obtain a desired average particle size.

Component (A) and Component (B) are maintained in separate packages and, substantially immediately before use, Component (B) is admixed with Component (A) to provide a conditioning hair lightener emulsion. One method aspect of lightening the natural color of hair with the conditioning hair lightener system comprises the steps of:

(i) contacting substantially dry hair in need of lightening with the conditioning hair lightener emulsion provided by a mixture of Components (A) and (B), and distributing the hair lightener emulsion therethrough;

(ii) maintaining the hair lightener emulsion in contact with the hair for a period sufficient to visibly lighten the natural color of the hair by at least one level, or to a desired shade level, to provide lightened hair, and

(iii) removing the hair lightener emulsion from the lightened hair.

In a preferred method aspect, step (iii) is performed by rinsing the hair with water, having a tepid temperature.

In another preferred method aspect of the hair lightening system, the lightened hair is contacted with a post-lightening, acidic aqueous medium having a pH of not more than about 5, preferably having a pH in the range of about 3 to about 4, either substantially immediately after step (ii), concurrently with, or

after step (iii). The contact with the acidic medium is maintained for a period of at least about one minute or a period sufficient to substantially minimize or stop any further alkaline or oxidative action of the emulsion on the lightened hair. Preferably a post-lightening acidic conditioner of the type discussed above is employed. Alternatively, the post-lightening, acidic aqueous medium may be an aqueous solution of a cosmetically acceptable organic acid, such as acetic acid, citric acid, tartaric acid, malonic acid, and the like.

Another method aspect includes contacting the lightened hair with a post-lightener cationic hair conditioner and removing the cationic hair conditioner with water.

In another method aspect, the further step (iv) of washing the hair is practiced with a post-lightening shampoo preferably having a pH in the range of about 4 to about 6.

The ameliorative effect of a conditioning hair lightener of this invention on the properties of oxidatively lightened hair can be evaluated instrumentally, as well as subjectively.

One preferred method of evaluating the elastic tensile strength of wet hair is referred to as the "Intermittent Stress Relaxation (ISR) Method" using a Dynamic Mechanical Analyzer (e.g., TA Instruments, Model Q800) equipped with a hair-fiber anchoring assembly that can be submerged in water. In the ISR Method, an individual hair fiber is clamped at two opposing portions in the fiber anchoring assembly, which is then submerged in water. The length of the submerged hair fiber is then stretched in water to a constant strain, such as 0.5% of its length for about 30 seconds, and allowed to relax by removing the strain for about 30 seconds, and this cycle of intermittent stress strain and relaxation is repeated for a total of about 10 cycles. The amount of stress (in grams/denier fiber) is measured and recorded before the hair fiber is given a hair lightening treatment, and after the hair lightening procedure. The change in the ratio (index) of the stress of the hair before lightening relative to the stress of the hair after hair lightening is indicative of loss or amelioration of loss in tensile strength from the chemical treatment. An index value of 1 = no change in hair strength, an index value of less than 1 indicates a loss (weakening) in tensile strength, and

an index value of greater than 1 indicates an increase (strengthening) in tensile strength. Measuring the elasticity of wet hair when stretched in the range of about 0.5 to about 1 percent of its length, is judged as simulating the range of strain applied during a conventional hair grooming process, such as combing and brushing of the wet hair.

Another preferred method for evaluating the wet elasticity of hair is referred to as the "Creep Recovery Method" which instrumentally measures the recovery of the length of a hair fiber after being stretched to a constant force, using a Dynamic Mechanical Analyzer (e.g., Perkin Elmer, Model 7e, with Pyris software) equipped with a hair-fiber anchoring assembly that can be submerged in water. In the Creep Recovery Method, an individual hair fiber is clamped at two opposing portions in the fiber anchoring assembly which is then submerged in a beaker (about 100 ml capacity) containing about 90 ml water. The submerged fiber is then stretched to a constant force, such as 100 milliNewtons (mN) for about 0.1 minute, the force is released and the fiber is allowed to recover (relax) to a force of about 5 mN for about 0.9 minutes, and this cycle of stretch and recovery is repeated for a total of about 15 cycles, while recording the creep recovery curve. A baseline creep recovery curve is measured and recorded in this manner from a hair fiber before being lightened, thereafter the hair fiber is removed from the instrument, allowed to dry (for at least about one hour at ambient room temperature), the dried hair fiber is given a hair lightening treatment and the creep recovery curve of the lightened hair is measured and recorded as previously described. An index value for the creep recovery of the wet hair after lightening relative to the creep recovery of the hair before lightening is calculated from the area of the curves. An index value of 1 = no change in hair strength, an index value of less than 1 indicates a toughening or strengthening of the hair, and an index value of greater than 1 indicates a weakening of the hair.

Another preferred method of evaluating amelioration is by the alkali solubility of the hair before and after hair lightening, and is referred to as the "Alkali Solubility Test Method." An increase in the alkali solubility of keratin (such as hair and wool) has been recognized in the art as being indicative of

undesirable degradation of the protein structure from chemical treatments. The alkali solubility of hair is evaluated by first obtaining the constant dry weight of a hair tress before receiving a hair lightening procedure (initial weight), then subjecting the hair tress to an alkaline hair lightener treatment for a given period of time, removing the hair lightener with water, drying the lightened hair, and then obtaining the constant dry weight (final weight) of the lightened hair. The alkali solubility is calculated from final weight of the lightened hair tress relative to the initial weight of the hair tress (i.e., before lightening) and expressed in terms of a percentage of the change (i.e., loss).

The conditioning hair lightener system is preferably provided in kits, with Component (A) in packaged form together with instructional indicia for admixing Component (A) with Component (B) for use. A preferred kit embodiment also includes Component (B), and, optionally, at least one of a post-lightening acidic conditioner, a post-lightening cationic conditioner, and a post-lightening shampoo, each in separately packaged form, and one or more of the following implements for performing the hair lightening process, i.e., disposable gloves, measuring scoop for Component (A), mixing tools, e.g., a mixing spatula, a mixing vessel, and the like. Preferably the hair lightening implements are substantially chemically unreactive with the oxidative ingredients in the hair lightener emulsion. The kit components preferably are contained in an outer package. The outer package can be a box or carbon or shrink wrap, and preferably has instructional indicia printed thereon or visible therethrough.

The components of the hair lightener system can be provided in amounts suitable for a single application or in sufficient amounts for multiple applications, and can be readily determined by those skilled in the art.

Useful instructional indicia can be printed media, aural media, visual aids, electronic media or a combination thereof, which instruct the user on how to admix the Component (A) with Component (B) and describe the use of the hair lightener emulsion product to lighten the hair. Printed media includes, but is not limited to, labels attached to or imprinted on the components of the kit, package inserts, pamphlets, books, flyers, and the like. Aural media includes, but is not limited to, tape recordings, audio compact disks, records, and the like. Visual

aids include, but are not limited, to photographs, slides, movies, videos, DVDs, and the like. Electronic media includes all forms of electronic data storage media, such as, but not limited to, diskettes, interactive CD-ROMs, interactive DVDs, and the like.

The following examples further illustrate the preparation and use of preferred embodiments hair lightening, but are not intended to be limited thereto.

Example 1.

Substantially anhydrous compositions for use in Component (A) are illustrated by embodiment range (1-A) and embodiment (1-B) shown in Table 1 prepared from a peroxy salt containing portion (P) and a self-emulsifying, fatty acid-derived conditioner (SFC) portion.

TABLE 1

Ingredient (INCI/Common Name)	Parts by Weight (As Supplied)	
Portion P	Range (1-A)	(1-B)
1. Potassium persulfate	15 - 40	29.7
2. Sodium persulfate	5 - 25	14.9
3. Ammonium persulfate	3 - 15	8.9
4. Tetrasodium EDTA	0 - 0.5	0.3
5. Xanthan gum	0.1- 2	0.7
6. Hydroxyethyl cellulose	0.4- 4	2.2
7. Polyquaternium-6 (Note 1)	0 - 4	3
8. Silica	3 - 15	8.9
9. Cocamide MEA	0 - 3	1.5
10. Sodium stearate	2 - 12	7.4
11. Aluminum stearate	3 - 15	8.9
12. Sodium metasilicate	4 - 17	13.1
13. Ultramarine Blue	0 - 0.75	0.5
SFC Portion	0.1-10	---

Note to Table 1.

1. Powder, such as sold under the tradename RHEOCARE® CC6P

A preferred liquid SFC portion embodiment is illustrated by embodiment range (1-C) and embodiments (1-D) and (I-E) shown in Table 2.

TABLE 2

Ingredient (INCI/Common Name)	Parts by Weight (As Supplied) Range (1-C)	(1-D)	(1E)
Caprylic/capric triglyceride	5 - 25	16	15
Glyceryl cocoate/citrate/lactate (Note 2)	25 - 40	34	25
PEG (40) sorbitan peroleate	30 - 65	50	40

Note to Table 2.
2. *INCI* name for a product sold under the tradename INWITOR® 380.

Component (A) can be prepared by the general method of separately preparing a homogeneous blend of ingredient Nos. 1-4, and of ingredient Nos. 5-13, admixing the two homogeneous blends and then adding the SFC portion, admixing until the formulation is homogeneous.

Example 2.

Component (A) was prepared from about 98.9 parts by weight of Portion P, Example (1-B), and 1.1 parts by weight of SFC Portion, Example (1-D). The SFC Portion was added to Portion P and admixed until homogeneous and free flowing (no clumps observed). Component (A) was then ground using a powder grinder unit, to a particle size in the range of about 0.3 to about 0.4 millimeters, determined by sifting Component (A) through a sieve having a 30 mesh size (100% pass through), and a 50 mesh size (not more than about 3 to about 6% remains in sieve).

Component (A) at a concentration of 1% in deionized water provided a pH in the range of about 10 to about 11. One part by weight of Component (A) admixed with two parts by weight of an aqueous medium containing about 6% hydrogen peroxide, Component (B), having a pH in the range of about 3.5 to about 4, provided a viscous, conditioning hair lightener emulsion having a pH in the range of about 10 to about 10.2, which formed substantially immediately (within about one minute).

Component (A) contained a total SFC content of about 1.1% by weight, based on the weight of Component (A). For use as a conditioning hair

lightener emulsion, Component (A) can provide about 0.4% SFC in a mixture of 1:2 Component (A): Component (B).

Example 3.

Post-lightening acidic conditioner embodiments are illustrated in Table 3 by embodiment range 3(A) and embodiments 3(B), 3(C) and 3(D).

TABLE 3

Ingredient (INCI/Common Name)	Parts by Weight (As Supplied)			
	3(A)	3(B)	3(C)	3(D)
1. PVP (K90P)	0.1 - 2	0.2	1.2	0.1
2. Botanical conditioners	0 - 3	0.5*	---	---
3. Betz® Polymer 1195	0 - 2	0.5	---	1.5
4. Preservative	q.s.	q.s.	q.s.	q.s.
5. pH adjusting agent to pH 3-4	q.s.	q.s.	q.s.	q.s.
6. Deionized water to 100 parts by weight (pbw)	q.s.	q.s.	q.s.	q.s.

q.s. = quantity sufficient

* Aloe Vera, (44 pbw); Actiphyte of Japanese Green Tea (55 pbw)

Example 4.

This example illustrates a method of lightening the color of naturally dark brown Caucasian hair using a conditioning hair lightener system and emulsion of this invention with and without employing a post-lightening acidic conditioner step, (Study 4-a and 4-b respectively), under simulated practical use conditions. The effect on the wet strength of the hair was evaluated by the Creep Recovery method as follows.

Study 4-a. A conditioning hair lightening emulsion (I) was prepared by admixing one part by weight of Component (A) of Example 2 with two parts by weight of Component (B), an aqueous hydrogen peroxide (6%) containing product, (MoisturColor™, 20 Volume, Moisturizing Creme Developer, Avlon Industries, Inc.). The creep recovery of the wet hair, before and after lightening with the hair lightening emulsion (I), was instrumentally evaluated by the Creep Recovery Method previously described using the Dynamic Mechanical Analyzer.

The average Creep Recovery Index (CRI) for five fibers per study was calculated and the results compared as described below.

An untreated test fiber of about 10 mm length, Caucasian hair (DeMeo Brothers) was submerged in about 90 ml water, and then subjected to a stretch and recovery cycle of being stretched to a constant force of about 100 mN for about 0.1 minutes, relaxed to about 5 mN for a recovery period of about 0.9 minutes, and repeating this stretch and recovery cycle for a total of about 15 cycles, to establish a baseline creep recovery curve. The fiber was then dried in air for at least about one hour at ambient room temperature and humidity.

The dry fiber was then given a hair lightener treatment by: (i) applying a sufficient amount of conditioning hair lightening emulsion (I) to coat the fiber, allowing emulsion (I) to remain in contact with the fiber for a hair lightening period of about 60 minutes; (ii) applying a sufficient amount of post-lightening acidic conditioner (II) of Example 3(B), having a pH in the range of about 3.5 to about 4, directly to the coated, lightened fiber (without an intervening water rinse) and left in contact therewith for about 5 minutes; (iii) rinsing the acidic-conditioned, lightened fiber with tepid tap water for about 3 minutes; (iv) contacting the water-rinsed, lightened fiber with a commercial cationic hair conditioner (AFFIRM® 5 in 1 Reconstructor, Avlon Industries, Inc.) for a period of about 5 minutes; (v) rinsing the cationic hair conditioner from the lightened fiber with water for about three minutes; (vi) washing the rinsed fiber with a non-conditioning, normalizing-type shampoo having a pH in the range of about 4.5 to about 5.5; and (vii) rinsing the shampooed hair with water for about one minute.

The resultant lightened fiber was dried in air for at least about one hour at ambient room temperature and humidity, the procedure for obtaining the Creep Recovery Index (CRI) was repeated, as described above, and the average CRI value was calculated.

Study 4-b. The procedure of study 4-a was repeated, except that the step (ii) of applying the post-lightening acidic conditioner (II) was omitted.

The hair lightened by the procedure of study 4-a had a calculated average CRI value of about 1.25 and the hair lightened by the procedure of study

4-b had a calculated average CRI value of about 1.97, based on five fibers per study. Relative to untreated hair (Index = 1), the creep recovery of the lightened hair fibers from study 4-a showed that contacting the lightened hair with the post-lightening acidic conditioner ameliorated the loss in elasticity to a significantly greater extent than lightening the hair without this step.

Example 5.

The beneficial effect of a conditioning hair lightener system of this invention on the subjective, tactile and visual, properties of the lightened hair was demonstrated as follows. A conditioning hair lightener emulsion (I) was prepared from 7 grams (g) of Component (A) of Example 2 and 14 grams of aqueous Component (B) containing about 6% hydrogen peroxide (MoisturColor™, 20 Volume, Moisturizing Creme Developer, Avlon Industries, Inc.). Emulsion (I) was applied to a Caucasian hair tress (about 5 g in weight, about 20 cm in length, medium brown in color) (DeMeo Brothers), and left in contact with the hair tress for a period of about 60 minutes, emulsion (I) was removed from the hair by rinsing with tepid tap water, and the lightened tress (Tress I) was air dried at ambient room temperature and humidity conditions for at least about 12 hours. For comparison, a separate similar tress (Tress II) was lightened by repeating the lightening procedure, except that the hair lightener emulsion was prepared with Component (A) of Example (1-B) to provide a non-conditioning hair lightener emulsion (II).

The subjective properties of the hair lightened with the conditioning hair lightener emulsion (I) of this invention (Tress I) were evaluated and compared to those of hair lightened with non-conditioning hair lightener emulsion (II) (Tress II) by a panel of seven persons. Each panelist evaluated the subjective attributes of ease of combing, degree of conditioning, visual sheen, and lack of static flyaway, for each of the tresses as described below in Table 4, based on a numerical rating scale of 1 to 5.

TABLE 4

Subjective Attribute	Average Rating* (5 = Most Preferred; 1 = Least Preferred) (Tress I)	(Tress II)
Ease of Combing (Dry)	5	3.6
Degree of Conditioning	4.9	3.9
Sheen	4.9	4.7
Lack of Static Flyaway	5	3.6

* Each panelist numerically rated the attribute as either 1, 2, 3, 4, or 5.

Each of the seven panelists also evaluated the subjective tactile properties (feel) of Tresses (I) and (II) based on the following numerical rating scale of: 1 = Brittle, strawlike; 2 = Very rough; 3 = Rough; 4 = Soft; 5 = Very soft. Five panelists rated the hair lightened (Tress I) by the conditioning emulsion (I) of this invention, as soft (Average Rating=4) and two panelists rated (Tress I) as very soft (Average Rating =5). In contrast, five panelists rated the hair lightened (Tress II) by the comparative emulsion (II) as rough (Average Rating=3) and two panelists rated (Tress II) as very rough (Average Rating = 2).

The results show that the beneficial effects of the conditioning hair lightener of this invention on the subjective properties of lightened hair were judged discernibly superior to those of hair lightened with the comparative, non-conditioning hair lightener.

Example 6.

This example illustrates the beneficial effect of a conditioning hair lightener of the invention, based on the Alkali Solubility Method, previously described. Caucasian hair tresses (about 5 g in weight, about 20 cm in length, medium brown in color) (DeMeo Brothers) were separately lightened for either about 30 minutes (A), about 45 minutes (B), about 60 minutes (C), or 90 minutes (D), as described in study 6-a and 6-b below.

Study 6-a. A conditioning hair lightener emulsion (I) of this invention was prepared by admixing about 7 grams of Component (A) of Example 2 with about 14 grams of aqueous Component (B) containing about 6% hydrogen peroxide (MoisturColor™, 20 Volume, Moisturizing Creme Developer, Avlon Industries, Inc.). Emulsion (I) was applied to a tress and left in contact therewith for the described selected lightening time period, emulsion (I) was removed from the tress by rinsing with tepid tap water, and the lightened tress was dried in air for at least about 12 hours at ambient room temperature and humidity.

The air-dried lightened tress was cut into small pieces. About 1 gram weight sample of the cuttings was placed in an aluminum weighing dish and heated to a temperature of about 105 °C for about 2 hours, cooled to ambient room temperature in the range of about 26 to about 27 °C in a chamber having a relative humidity of about 65%, and weighed to obtain a constant initial dry weight. The weighed sample was then transferred to an Erlenmeyer flask (250 ml capacity) containing about 100 ml of 0.1N NaOH (preheated to a temperature in the range of about 60 to about 63 °C). The flask was sealed with a cling wrap film to exclude air. The flask contents were heated for about 60 minutes at a temperature in the range of about 60 to about 63 °C. The heated hair sample was then filtered (Whatman Paper Filter), and sequentially washed six times with deionized water (about 50 ml/washing), washed once with about 50 ml aqueous acetic acid (1%), washed six times again with deionized water (about 50 ml/washing), and then dried in air for at least about 12 hours at ambient room temperature and humidity. The air dried hair sample was then heated in an oven at a temperature of about 105 °C for about 2 hours, cooled to ambient room temperature in the range of about 26 to about 27 °C in a chamber having a relative humidity of about 65%, and then weighed to obtain a final constant weight

The alkali solubility was calculated from the loss in the weight of the hair after the hair lightening procedure, expressed as a percentage of the initial weight of the hair (i.e., before hair lightening). The average percent alkali

solubility, based on three separate samples per lightening time period is shown in Table 5.

Study 6-b. The procedure of study 6-a was repeated, except that the hair lightener emulsion (II) was prepared by admixing about 7 grams of Component (A) of Example (1-B) with about 14 grams of the Component (B).

The average % alkali solubility of the tresses from study 6-a (Tress (I-A)-(I-D)) and the tresses from Study 6-b (Tress (II-A)-(II-D)) are shown in Table 5, compared to the average % alkali solubility for unlightened hair (control).

TABLE 5

Lightening Treatment	Lightening Time (Min.)	Alkali Solubility Average %
Control, None	None	7.7
Study 6-a, Tress (I-A)	30	9.6
Study 6-b, Tress (II-A)	30	10.3
Study 6-a, Tress (I-B)	45	16
Study 6-b, Tress (II-B)	45	21.6
Study 6-a, Tress (I-C)	60	16.5
Study 6-b, Tress (II-C)	60	24
Study 6-a, Tress (I-D)	90	23
Study 6-b, Tress (II-D)	90	26.7

The level of hair lightening achieved on Tress (I) and Tress (II) was judged substantially equivalent. The results show that the conditioning hair lightener emulsion (I), which contained about 0.4% SFC, beneficially diminished the alkali solubility of the lightened hair at all times compared to that of hair lightened with high lightener Emulsion (II) containing no SFC.

Example 7.

This example illustrates the beneficial effect of a conditioning hair lightener of this invention by the Intermittent Stress Relaxation (ISR) Method previously described.

Study 7-a. One part by weight Component (A) of Example 2 was mixed with two parts by weight of aqueous Component (B), containing about 6% hydrogen peroxide (MoisturColor™ 20 Volume, Moisturizing Creme Developer, Avlon Industries, Inc.) to provide a conditioning hair lightener emulsion (I) of this invention containing about 0.4% by weight SFC.

A tress was prepared of Caucasian hair (about 1g in weight), naturally brown in color, (about 20 cm in length) (DeMeo Brothers) in which the hair fibers were mixed to provide a random blend of root-to-tip and tip-to-root orientation. About a 10 cm portion of the hair tress (referred to as the upper portion) was secured within a plastic tube to prevent contacting the upper portion of the hair tress with the hair lightener emulsion. The remaining exposed portion of the hair tress (referred to as the lower portion) was then contacted with a sufficient amount of conditioning hair lightener emulsion (I) to substantially uniformly coat the tress and lightened for about 60 minutes.

The conditioning hair lightener emulsion (I) was removed from the hair by rinsing the hair with tepid tap water for about 3 minutes. The rinsed hair was then coated with a commercial cationic hair conditioner (AFFIRM® 5 in 1 Reconstructor, Avlon Industries, Inc.) for about 5 minutes, followed by rinsing with tepid tap water for about 3 minutes, shampooing with a non-conditioning, normalizing-type shampoo having a pH in the range of about 4.5 to about 5.5 and then rinsed for about one minute with tepid tap water.

The ISR was evaluated for eight fibers randomly sampled from the hair tress by measuring the ISR of the untreated portion and the lightened portion of the same fiber and then calculating the ISR Index in this manner for each of the fibers.

Study 7-b. The procedure of study 7-a was repeated except that the hair lightener emulsion I was prepared with one part by weight of Component (A) of Example (1-B) to provide a hair lightener emulsion (II) containing no SFC.

Relative to untreated hair (ISR Index=1) the average ISR Index for fibers from Study 7-a was about 0.89 and for fibers from Study 7-b was about 0.79. The results show that the conditioning hair lightener emulsion (I)

ameliorated the loss in elasticity of the fibers to about 11% whereas the hair lightener emulsion (II) represents a loss of about 21% elasticity.

The foregoing examples show that a conditioning hair lightener of this invention prepared with Component (A) containing a self-emulsifying, fatty-acid derived (SFC) conditioner ameliorates the deleterious effect associated with lightening the color of hair with peroxy salt containing hair lighteners under relatively high alkaline conditions.

The foregoing examples are intended to be illustrative and not limiting. Numerous variations and modifications may be effected without departing from the true spirit and scope of the invention.

Claims

1. A substantially anhydrous composition for preparing a hair lightener emulsion comprising:

a conditioning amount of a water-dispersible, self-emulsifying, fatty acid-derived conditioner;

an effective hair lightening amount of at least one peroxy salt compound; and

optionally, a water-soluble cosmetic adjuvant;

wherein the composition is substantially free-flowing, and which upon being mixed with an aqueous medium for use as a hair lightener substantially immediately forms an emulsion.

2. The composition of claim 1 wherein the self-emulsifying, fatty acid-derived conditioner comprises a fatty ester, an ethoxylated glyceride, a fatty alcohol, a fatty ether, and any combination thereof, and any formulation thereof optionally containing at least one hydrophilic surfactant.

3. The composition of claim 1 or 2 wherein the self-emulsifying, fatty acid-derived conditioner comprises at least one polyhydric ester selected from the group consisting of: (a) a C_3-C_4 polyol ester of a C_6-C_{22} fatty acid, (b) a glyceryl ester of a C_6-C_{22} fatty acid and at least one acid selected from the group consisting of citric acid, lactic acid and succinic acid, and (c) a polyethoxylated C_{12}-C_{18} acylated sorbitol ester.

4. The composition of any one of claims 1 through 3 wherein the self-emulsifying, fatty acid-derived conditioner comprises predominantly a C_8-C_{10} fatty acid ester of a polyol selected from the group consisting of glycerin, propylene glycol, butylene glycol and mixtures thereof.

5. The composition of any one of claims 1 through 4 wherein the self-emulsifying fatty acid-derived conditioner comprises caprylic/capric triglyceride.

6. The composition of any one of claims 1 through 5 wherein the self-emulsifying fatty acid-derived conditioner comprises glyceryl cocoate/citrate/lactate.

7. The composition of any one of claims 1 through 6 wherein the self-emulsifying fatty acid-derived conditioner comprises PEG-40 sorbitan peroleate.

8. The composition of claim 1 wherein the self-emulsifying, fatty acid-derived conditioner comprises a combination of: (a) caprylic/capric triglyceride; (b) glyceryl cocoate/citrate/lactate; and (c) PEG-40 sorbitan peroleate.

9. The composition of any one of claims 1 through 8 wherein the peroxy salt is selected from the group consisting of an alkali metal persulfate, ammonium persulfate, and mixtures thereof.

10. The composition of any one of claims 1 through 9 containing a cationic polymer.

11. A conditioning hair lightener emulsion prepared from at least two components, (A) and (B), wherein Component (A) is a composition of any one of claims 1 through 10 and Component (B) comprises an aqueous medium containing an effective hair lightening amount of hydrogen peroxide or source thereof, and wherein the hair lightener emulsion has a pH of at least about 8.

12. The conditioning hair lightener emulsion of claim 11 wherein the pH is at least about 9.

13. A method of lightening hair comprising the steps of:

(i) contacting substantially dry hair with the conditioning hair lightener emulsion of any one of claims 11 or 12 and distributing the composition therethrough,

(ii) maintaining the applied conditioning hair lightener emulsion in contact with the hair for a period sufficient to visibly lighten the color of the hair to a desired shade level, to provide lightened hair, and

(iii) removing the hair lightener emulsion from the lightened hair.

14. The method of claim 13 wherein the lightened hair is contacted with a post-lightening aqueous acidic medium having a pH of not more than about 5 substantially immediately after step (ii), concurrently with step (iii), or after step (iii).

15. The method of claim 14 wherein the aqueous acidic medium contains a cationic polymer.

16. The method of any one of claims 14 or 15 wherein step (iii) is performed by rinsing the hair with water.

17. The method of any one of claims 14 through 16 further including a step of contacting the lightened hair with a composition containing a cationic hair conditioner after step (iii), and removing the conditioner as by rinsing with water.

18. The method of any one of claims 14 through 17 further including the step (iv) of washing the lightened hair with a shampoo having a pH in the range of about 4 to about 6.

19. A conditioning hair lightener system comprising at least two components, (A) and (B), wherein:

Component (A) is a composition of any one of claims 1 through 10, and

Component (B) is an aqueous medium containing hydrogen peroxide or hydrogen peroxide source,

wherein Component (A) and Component (B) are maintained separate, and substantially immediately before use, Component (A) and Component (B) are mixed together to provide a conditioning hair lightening emulsion having a pH of at least about 8.

20. The conditioning hair lightener system of claim 19 further including a post-lightening acidic hair conditioner having a pH of not more than about 5.

21. The conditioning hair lightener system of any one of claims 19 or 20 further including a post-lightening cationic hair conditioner.

22. The conditioning hair lightener system of any one of claims 19 through 21 further including a post-lightening shampoo having a pH in the range of about pH 4 to about 6.

23. The conditioning hair lightener system of any one of claims 19 through 22 wherein Component (A) includes a cationic polymer.

24. The conditioning hair lightener system of any one of claims 19 through 23 wherein either of Component (A) or Component (B) includes a hair protective, deswelling agent.

25. The conditioning hair lightener system of any one of claims 19 through 24 wherein the post-lightening, acidic hair conditioner includes a nonionic polymer, a cationic polymer or combination thereof.

26. An article of manufacture comprising a kit containing at least Component (A) of any one of claims 1 through 10 in packaged form.

27. The article of manufacture of claim 26 including Component (A) and Component (B) of any one of claims 1 through 10, each in separately packaged form.

28. The article of manufacture of claims 26 or 27 further including one or more of the following:

a post-lightening acidic hair conditioner;

a post-lightening cationic hair conditioner;

a post-lightening shampoo, each in separately packaged form; and

instructional indicia.

29. The article of manufacture of any one of claims 26 through 28 further including one or more hair lightening implements.

Abstract

A conditioning hair lightener system, compositions, method, and kit therefor, is disclosed which ameliorates the deleterious effects of chemical oxidative hair lightening on the strength and subjective properties of hair. A conditioning hair lightener system comprises a conditioning hair lightener emulsion having a pH of at least about 8 prepared from at least two components, (A) and (B). Component (A) is a substantially anhydrous, substantially free-flowing composition comprising a conditioning amount of a water-dispersible, self-emulsifying, fatty acid-derived conditioner and an effective hair lightening amount of a peroxy salt compound. Component (B) is an aqueous medium containing hydrogen peroxide or hydrogen peroxide source. Components (A) and (B) are maintained separate until substantially immediately before use, and are mixed together to provide a conditioning hair lightener emulsion.